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CONSERVATION

OF

LIFE AND PROPERTY

FROM

FIRE

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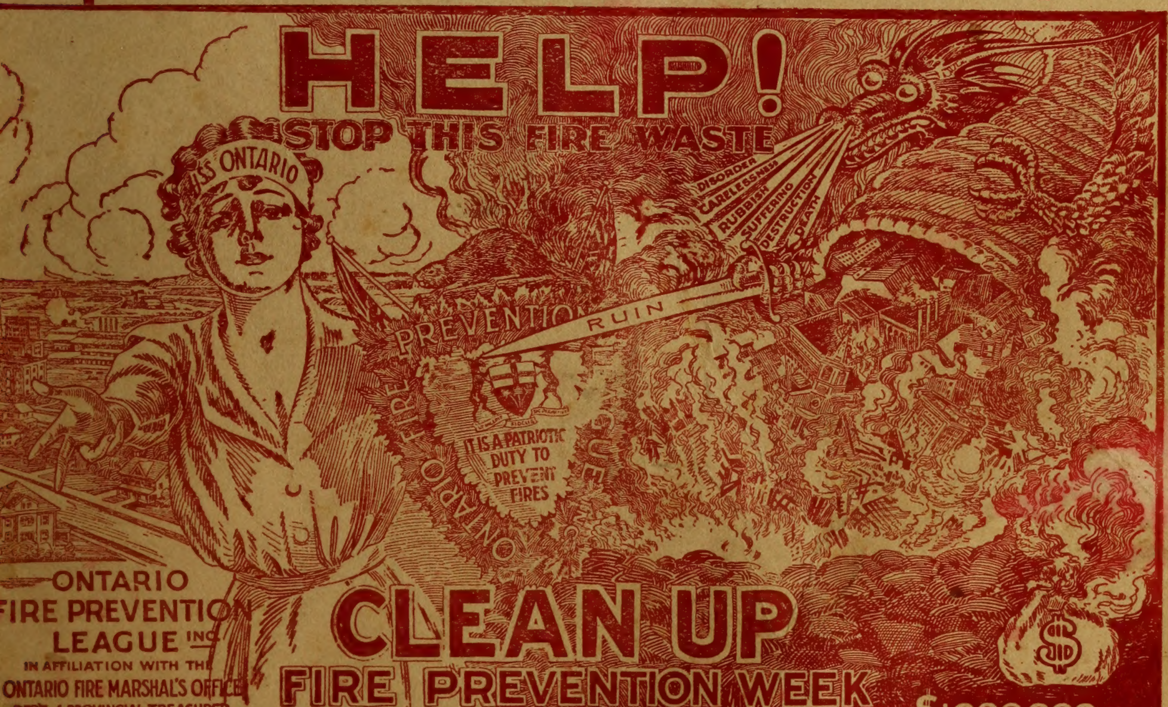

GOOD INTENTIONS

A $200,000 FIRE IN N. W. ONTARIO

This photograph illustrates the terrible holocaust, suffering and loss that destroyed the business section of a prosperous, self-satisfied, growing town.

The fire appears to have been caused by a match in the hands of a careless smoker. If the town had been properly planned, kept reasonably clean and free from accumulations of rubbish, the conflagration would not have occurred.

The various Mayors, Councils of past years and the business men realized that the town needed fire protection. They talked about it, they passed resolutions, their intentions were good, *but they did not purchase* the pump, the hose and the chemical engine that they talked about. How many towns and villages are similarly situated?

The fire fiend's fangs are getting deeper and deeper into the vitals of the nation while those most interested calmly watch the destruction of their substance and the gradual sapping of the resources—the life-blood—of our country.

ONTARIO FIRE PREVENTION LEAGUE, INC.

IN AFFILIATION WITH THE

ONTARIO FIRE MARSHAL'S OFFICE

TORONTO

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CONSERVATION
OF
LIFE and PROPERTY
FROM
FIRE

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"CARELESSNESS CAUSES FIRES."
"CLEANLINESS AND CAREFULNESS
WILL PREVENT FIRES."

The Ontario Fire Prevention League, Inc., aims:

"To co-operate with the Provincial Government and the Ontario Fire Marshal's Office for the purpose of promoting the science and improving the methods of Fire Prevention and Fire Protection; to obtain and circulate information on these subjects; to assist in securing proper safeguards against loss of life and property by fire; to keep the subject before the people, especially the young, and endeavor to inculcate the idea that *it is a patriotic duty to prevent fires.*"

Office of the Ontario Fire Marshal, Department of the Provincial Treasurer,
Parliament Buildings, Toronto.

E. P. HEATON,
Fire Marshal.

GEORGE F. LEWIS,
Deputy Fire Marshal.

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1920.

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COMMUNITY SERVICE

Once upon a time a Lion was disturbed by a Mouse running over his face.

Rising in anger, the Lion's paw dropped on the Mouse. "Please let me live," begged the Mouse, "and some day I'll do as much for you."

Shortly after, the Lion was caught in the net of a hunter. He struggled and fought and struck blindly, until his spirit and strength were broken, and he lay helpless and dying.

The Mouse, recognizing his roar, came up, gnawed and nibbled the rope and gave the King of Beasts his life.

The Mouse taunted the Lion for ridiculing the idea of his ever being able to help him; and reminded him that is was possible for even a Mouse to confer benefits on a Lion.

This Fable illustrates in a striking manner what real service means; and from it we learn the lesson that everyone, young and old, rich and poor, strong and weak, is fitted to take an active part in the work of conserving the lives and resources of our people. Especially is this obvious with regard to the Prevention of Fire.

The talents with which we are endowed, be they great or small, can be used for the benefit of our fellow men.

No matter how young, how inexperienced, how insignificant our physical strength may appear to be; or how small a part we may be assigned in the cast of life's drama, we have potential resources that can be applied to help and benefit others.

Self-satisfaction and contentment with present conditions is a most dangerous factor in the life of an individual, a community or a nation. No great thing has ever been done without a vision. It has been well said that there exist in every community the forces and the ability to solve that community's problems. They may be and frequently are undeveloped, but they are none the less there. These forces must be sought out, stimulated, trained, and developed, and then applied to problems of the community. Efficiency follows organized effort.

"Wastefulness" is one of our besetting sins, and fire waste—eighty per cent. of which is preventable—is an economic crime; caused principally by carelessness and indifference.

The Three Hundred and Fifty Million Dollar annual fire waste of the North American Continent is a contributing factor to the high cost of living.

To make up this stupendous amount of money an indirect tax is levied on every man, woman and child in the country. It is assessed on everything we eat, drink and wear through insurance premiums, collected and distributed by the insurance companies, which makes it plain that YOU PAY and that the fire losses are gradually, but none the less effectively, impoverishing the country; for that which is burnt is irretrievably lost.

Two out of every three fires occur in our homes, which is a serious matter to contemplate when we consider the housing problem and the high cost of building material.

It is yesterday's dirt that always starts the fire. The factories and industrial plants are, however, responsible for the big losses. Approximately five per cent of the entire number of fires occur in this classification, and are responsible for nearly fifty per cent. of the total amount of the annual loss.

More than four times as many people are burned to death every year in Canada as are killed on steam or electric railroads. The estimated death toll caused by fire on the North American Continent is thirty thousand human beings yearly.

When the people decide to put the same energy into production and the conservation of necessities that animated them during the War, social unrest will be dissipated and high cost of living problems will be quickly solved.

You naturally take pride in your city—in your home town—you want to make it great and still greater; but to do that you must give protection to the lives and property of those who come to live there and to those who invest their money. Action is what counts—the world is full of good intentions and procrastination "which is the thief of time." It steals more than time. It steals enthusiasm, confidence, energy, opportunity, and all that go to make a forceful character and a successful life.

Study local conditions and adopt the best and most practical methods of preventing fire. The following suggestions are necessarily of a general character and are a mere outline for Fire Prevention work which will be found both interesting and instructive, and of great economic benefit to the community in which you reside as well as a source of civic pride.

George P. Lewis.

Secretary Ontario Fire Prevention League, Inc.

PREVENTION OF FIRE IN THE HOME

The best time to fight fires is before they occur. Most fires may be prevented by promptly correcting hazardous conditions; such as disorder, accumulation of rubbish and litter, carelessness, defective equipment, faulty construction, and insufficient protection.

These are the first steps towards effective "Fire Prevention" in the store and factory as well as in the home.

Statistics

The fire waste in Ontario, not including forest fires, for the year:

1916 was $16,520,206, caused by 10,279 fires.
1917 was $10,365,539, caused by 9,681 fires.
1918 was $15,673,240, caused by 9,740 fires.
1919 was $10,514,232, caused by 9,396 fires.

The average fire loss for the last three years exceeds one million dollars a month; a per capita loss of $5 for every man, woman and child in the Province. The average annual fire loss in the principal European countries, under normal conditions, is 33 cents per capita.

Good Housekeeping

The attic, cellar, closets, yards and outbuildings should be cleaned at least twice a year, in the spring and in the autumn, and all useless material and rubbish removed or burned. Store all remaining articles away neatly and see that passages are unobstructed.

In storing away clothing, furs, etc., first remove all matches and other combustible material from the pockets. Do not go into clothes closets with lighted candles or matches—use an electric flashlight. Do not hang clothes near stove pipes, hot chimneys, steam pipes or stoves.

Get rid of rats and mice. They are disease carriers and their nests are fire traps.

Never light a fire with coal oil or throw coal oil on a fire to quicken it; it may cost you your life.

Oily waste or rags used in polishing furniture or cleaning machinery, if left around the house, are liable to cause a fire from spontaneous combustion. An oily mop has been known to ignite from spontaneous combustion within one hour.

Use your influence against the pernicious habit of smoking in bed, putting a lighted pipe in coat pocket or leaving lighted pipe, cigar or cigarette stubs lying around the house; they are extremely dangerous and invite disaster.

Metal baskets or cans are the only safe receptacles for all waste material and rubbish. Provide a metal receptacle for cigar and pipe ashes, cigarette butts and matches, and see that they are put in the place provided for them.

Watch careless smokers.

Never throw a match, nor allow smokers to throw cigarette butts or cigar ashes in a waste paper basket.

Great care should be exercised in using polishes, cleaning fluids or chemicals unless their contents are known and you are sure that they are not of an inflammable character.

Never pile articles or merchandise up against cellar windows, as firemen have frequently to use the cellar windows as an entrance in case of fire.

Stairways and passages should be kept clear of all materials or stock at all times.

Fire escapes should not be obstructed. Doors and windows leading to fire escapes should not be locked, but left so that they could be easily and quickly opened in case of emergency.

All fire extinguishing apparatus should be kept in good working order and easily accessible.

Dont fail to notify the nearest fire station or one of the local firemen of anything you see that is dangerous or liable to cause a fire.

The Furnace Room and Heating Apparatus

Of all places in the home or factory the furnace or boiler room should be the acme of order and cleanliness, and absolutely free from accumulations of combustible refuse.

They are homeless now.

Soft Coal

Fires frequently occur in piles of soft coal from spontaneous combustion. Good ventilation should be provided in storing soft coal in buildings, to carry off methane and other gases escaping from the coal and thus prevent its ignition and explosion on contact with incandescent masses of coal, or from other sources.

Notwithstanding the many investigations, tests and experiments which have been undertaken to discover and explain the phenomenon of spontaneous heating of soft coal, the opinions and conclusions of expert authorities giving consideration to the problem, appears to have gone no further than to agree that oxidation of some one or more of the elements of a coal compound is the prime cause, leaving still in doubt the important question as to which one or more of these elements when combined with oxygen of the atmosphere, may with any certainty be ascribed the promotion of oxidation of such intensity and with such rapidity as to incite ignition.

There appears to be practically unanimous consensus of opinion between the experts and experienced handlers of soft coals, that whatever may be the elements of a coal compound which are variously credited with being promotive of spontaneous heating, such action is most surely promoted when coal is stored in finely comminuted condition such as dust, slack or screenings, and when these "fines" are intimately mixed with larger sizes there is thus exposed a large surface to the action of the air which facilitates rapid oxidation.

Records of coal fires show that some types of coal are so susceptible as to ignite when rained upon while in transit in open cars, and also when piled in the open. It would thus appear that it is not so much the quantity of coal in a pile that one must control, as the quality or component parts of the coal. In other words, coal from certain mines is liable to ignite quicker than that from other localities. But unfortunately it is impossible for the individual consumer to know from whence the coal comes.

Precautionary measures of a general character must, therefore, be taken.

Prevention

So as to provide proper ventilation, coal should not be piled, when stored in buildings, more than five feet in height, and should be divided into compartments, or sections, by brick or other fire resistive walls, so that in case a fire does start, the entire pile will not be endangered.

Coal piled in the open should not exceed a height of eight feet, and may well be divided by fire walls, as above outlined.

The subject of Spontaneous Combustion in coal is a big one and cannot possibly be discussed in detail in a brochure of this size.

Avoid piling coal against wooden partitions, posts, or in contact with boiler or furnace walls; against, or close to steam pipes, hot air flues or other external sources of heat. Heat stimulates oxidation in proportion to the increase in temperature.

Safety will be further insured through the selection and storage of as high grade coal as possible.

Never put ashes in wooden barrels or boxes.

Overheated Stoves

Bear in mind that soft coal ignites faster than hard coal.

To prevent overheated stoves it is necessary to watch the fire and drafts more carefuly when burning soft coal or wood.

Hot Ashes

Use metal cans for ashes. Never put ashes in wooden receptacles or pile them up against wood.

Chimneys and Stove Pipes

Be sure the chimney is safe and clean; and that all flue holes not in use are covered with tight-fitting metal caps. Should any be left open, a sudden pressure of air from heavy winds will force sparks into the room.

Never place paper near or over a flue opening.

Chimneys should rise at least three feet above the roof.

See that all stove pipes are clean and free from rust holes.

Where stove pipes run through floors or walls they should be protected with metal ventilated thimble or collar, so as to leave an air space between the pipe and the wood, or lath and plaster, through which the pipe passes.

It is well to have the fewest possible number of elbows, and these should be placed at an angle of forty-five degrees to avoid horizontal runs of pipe, which collect soot and shut off draft.

Hazard from Stoves and Ranges

The floor underneath and surrounding the stove or kitchen range should be protected with a metal plate extending to a distance of at least eighteen inches in front to protect the floor from live coals. Wooden partitions or other inflammable material near stoves or pipes should be covered with asbestos and with sheet metal guard. Leave an air space of at least two inches between the metal and the woodwork.

Examine grates and fire pots carefully to see that no parts are cracked, broken or out of place.

Replace all cracked or broken mica windows in stoves.

Never place wood in an oven to dry nor combustible material on heating apparatus, flues or pipes.

Steam or hot air should be used for heating factories, stores and warehouses; stoves are dangerous and should be eliminated.

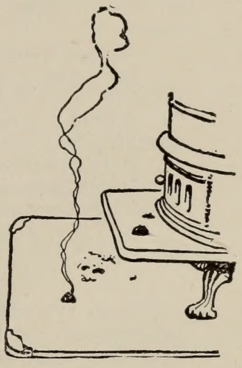
If you smell smoke, investigate until you find the cause.

Open Fires

Do not heap up the grate and then go away and leave the fire. All open fires should be screened.

Oil Stoves

Extreme care should be exercised with alcohol and oil stoves. They should be filled, cleaned, and trimmed in the daylight and away from any open flame.



The floor covering must extend beyond the stove.

Gas Stoves

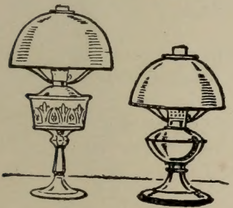
Gas stoves and other heaters should have a ventilating flue to carry off the burning gas fumes which are poisonous. Examine all valves and see that they are tight and do not leak. Never attempt to light the oven burners without first opening the oven doors, so as to allow any leakage of gas to escape and prevent an explosion.

Keep hoods and pipes of the kitchen ranges free from grease and lint by frequent cleaning with hot water and soap.

Don't Pour Coal Oil in the Stove

Coal oil should never be poured in a stove in which there is a spark of fire; neither should it be used in a stove in which the fire is out, but in which parts of the stove are still warm. The only safe way is not to use it for either starting or quickening a fire.

Types of lamps.



Wrong. Right.

Filling Lamps and Stoves

Never fill a coal oil lamp, oil stove or heater while it is lighted. Don't fill it too full—leave a little room for the air to expand.

Coal oil lamps made of metal with heavy bases are safer and preferable to lamps made of glass.

Most fires from coal oil are due to the use of glass lamps.

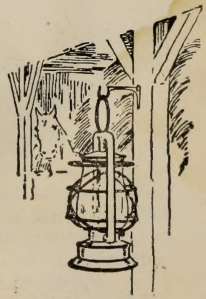
Oil stoves left alone, and with children, have taken both property and life as toll.

Never fill a lamp except in daylight. It is dangerous to leave a lamp burning all night, especially if it is dirty or made of glass.

Keep the Lamps Clean

Keep the burner of your lamp clean and the wick trimmed. The common cause of odor from lamps and overheating fonts is the clogging of the tiny air holes at the base of the burner under the cap and the crust which forms at the top of the wick tube.

Boil burners occasionally in a solution of sal soda and water, which will soften and aid in removing the crust. Keep your coal oil *can* in a safe place, preferably outside the house, and never allow the floor around the *can* to become saturated with oil.



Take no risks with lanterns.

Lanterns

Lanterns are safe only when clean, well trimmed, properly filled, free from leaks and hung on hooks out of the wind, away from cobwebs and other combustibles, and out of the reach of horses and cattle.

EXPLOSIVES

Open lights or flame should never be used in the presence of gas, gasoline, acetylene, xylol, benzol or other volatile inflammable materials or in the presence of inflammable dust while in circulation as a cloud.

Gas

If the odor of gas, or other inflammable vapors, is detected, ventilate the place thoroughly *before* trying to find the leak. If possible, shut off the gas at meter. Use an electric hand flashlight if artificial light is required. *Be careful where you strike a match.*

All gas connections should be of metal pipe with air-tight joints.

Do away with swinging brackets and rubber gas tubes from the house—all gas brackets should be rigid.

Provide wire guards or enclose the gas jets completely wherever it is possible for anything to come in contact or blow against them, such as curtains, etc.

It is dangerous to leave jets or gas stoves burning over night.

Metal bells should be placed over gas jets on low ceilings. All exposed woodwork under or near gas stoves should be protected with sheet metal.

GASOLINE

With the increasing use of gasoline and other fuels that are dangerous because of their ready inflammability, there is each year an increasing number of accidents and fires that cause loss of life and great damage to property.

Cleaning

Many fires originate from the cleaning of silks with gasoline, the violent rubbing of the silk generating static electricity which produces a spark that ignites the vapor.

Fires are caused by using gasoline in an open vessel and introducing an open flame at the same time. *Don't take a chance.*

Where gasoline is used for cleaning purposes it should be kept in a small self-closing can; and any that is not used should be emptied into the main container outside the building before leaving the premises at night.

Automobile Hazards

A dangerous practice is the cleaning of auto parts with gasoline from an open can. A spark may be caused by striking two pieces of metal together, by the ignition system on the automobile when the starting crank is turned, and in other ways. For instance, a nut that was stuck was struck with a wrench causing a spark, and instantly the car was enveloped in flames.

Automobiles, gas engines and tractors should be kept in isolated buildings. The number of automobiles owned by farmers is steadily increasing and the fire hazard on the farm is increased accordingly.

Automobile engine heaters, with *exposed wiring*, or, prepared fuel burned in a container attached to the manifold, are extremely dangerous, and should not be used.

Danger from Sparks and Open Lights

No open light or flame of any kind nor any machine or belt capable of producing a spark should be allowed in the room where gasoline is being used.

Signs

Wherever gasoline is stored, danger signs should be posted on the doors, warning against the carrying of lights of any kind.

Invisible Hazard

Gasoline vapor is heavier than air, consequently it will float along near the ground, like an invisible stream, and may carry thirty feet or more, and under favorable conditions ignite.

One gallon of gasoline has substantially the power equal to eighty-three pounds of dynamite.

Gasoline will give off 130 times its bulk in vapor; and when vaporized will convert 1,560 times its volume of air into an explosive mixture, which will ignite from a flame or spark.

Five gallons of gasoline will generate 8,000 cubic feet of gas; or enough to fill a room 20 x 40 feet and 10 feet high. When ignited it immediately expands to 4,000 times that space. This would cause a most destructive explosion with probable loss of life.

Store Underground

When large quantities of gasoline are used, the main supply should be stored in a metal tank buried underground and a safe distance from buildings.

Paint Can Red

Never use an oil can in an emergency for gasoline nor a gasoline can for oil. Paint the gasoline can "RED."

Sand

Pails of sand and a scoop or shovel should be kept for use in case of fire where inflammable liquids are used.

MATCHES

"Familiarity breeds contempt," and as matches are one of the commodities of our daily life with which we are most familiar, this possibly accounts, to some extent, for the great number of fires caused by these little sticks of wood with a head that does no thinking. In 1918 there were 991 fires caused by matches, entailing a loss of $552,404, in Ontario.

Ten per cent. of all the fires in Ontario are caused by carelessness with matches, and many innocent lives are sacrificed yearly by children playing with matches.

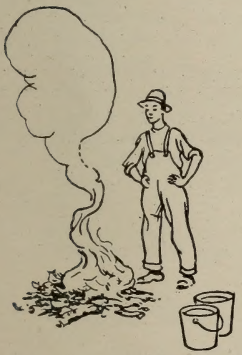
Safety matches—the kind that strike only on the prepared surface of the containing box—are the only matches that should be used. Keep matches in a metal receptacle out of the reach of children.

Caution children against playing with fire or lighted matches.

For lighting gas use a metal "Friction Lighter"; it is both safe and cheap. An automatic push button in connection with a "Pilot Light" is a safe way to light gas ranges; or use an electric lighter.

Keep matches out of the pockets of clothes hung in closets; they may cause a fire by spontaneous combustion. Never throw a burned match away unless you are sure it is out. A good plan is to break the stick in two and then you will be sure that there is no fire left in it.

Don't let the baby play with matches.



Take precautions with bonfires.

Loose Matches

Matches should not be carried loose in a person's pocket. A match may easily be dropped in inflammable material, and, if stepped on, cause a fire.

Bon Fires and Brush

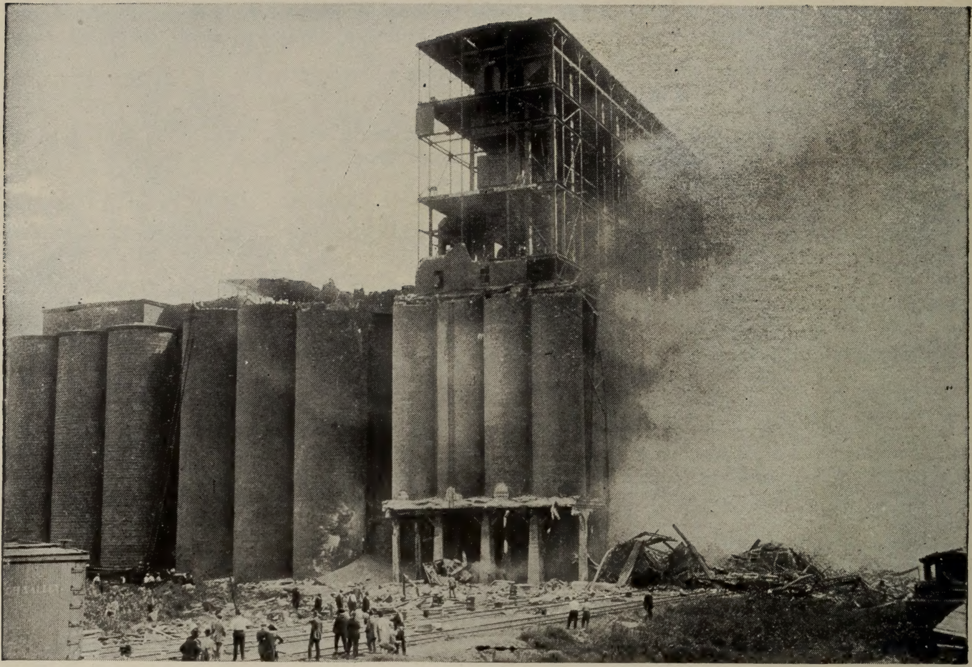
Do not start a bonfire nor burn brush or rubbish near the house, fence or outbuildings, and never when the wind is blowing.

Weeds and Grass as a Fire Menace

Keep grass, weeds and brush cleared away from buildings, as a spark from a locomotive, match or cigarette may ignite them and burn the premises. Do not permit the accumulation of any waste material such as shingles, waste paper, old lumber, empty boxes and straw near buildings, especially those of wooden construction.

DUST DANGERS

A dust explosion is very similar to a gas explosion, except that particles of dust are a little bit larger than the gas particles. As with gas—there must be a proper mixture of dust and air and a spark or flame present which has sufficient heat to ignite the dust before an explosion can occur. The finer the dust the more easily it is ignited and the more disastrous the explosion. A pile of dust in a room or a sack or barrel of flour, or any finely pulverized carbonaceous material, will not explode so long as it stays in the pile or sack. It must be in suspension as a cloud in the air and the cloud be sufficiently dense before it can be ignited and the flame propagate through the cloud with explosive force.



Grain elevator disaster, caused by dust explosion.

Dust explosions have caused the destruction of millions of dollars' worth of property in grain and cereal plants, flour mills and sugar refineries, besides great loss of life.

Explosions are caused by electric sparks, fire from friction in machinery, as well as by open lights.

Cleanliness is the first precaution. Mechanical dust collectors are essential where processes generate fine dust, such as starch, flour, coal, cork, sawdust, grain dust, powdered sugar, etc.

SPONTANEOUS COMBUSTION

Spontaneous combustion may be explained as the ignition of a body by the internal development of heat without the action of an external agent. It frequently takes place in oily waste or heaps of rags, wool or cotton soaked with oil; and in piles of coal, especially fine, soft coal. In the case of oily waste it is caused by the rapid spontaneous oxidation of oil, which raises the temperature sufficiently to make it burst into flame.

Sweating Hay

It is an acknowledged fact that combustion will take place in hay not well cured, as well as in other farm products, and is the cause of many barn fires.

Hay or straw when thoroughly dried, but which later becomes wet, will, if densely packed, be liable to ignite spontaneously just the same as if it were densely packed without having been thoroughly dried.

Greater care should be exercised in the curing of hay and more attention should be given to the proper ventilation of the stack, barn or other building in which it is stored.

Horses and cattle do not like to eat hay that has heated or is mildewed.

In hay the cells continue to live and breathe for sometime after it is cut, and they alone in a close mow heat the hay; added to which is the heat from microscopic spores of fungi which continue to grow in the blades of hay during the period of fermentation. There is also the heat generated by the development of the hay seeds, the alfalfa, or the clover, together with the heat of the sun upon the roof and sides of the building.

These various causes acting together may heat closely packed hay stored where there is little or no ventilation to a temperature at which the hay begins to char. With the formation of charcoal, oxygen is absorbed, and the mass grows still hotter until it reaches a temperature of about 265 deg. F., when it bursts into flame.

Prevention

Besides proper ventilation a very good anti-spontaneous remedy is to salt the hay when it is being stored away.

Further details may be had regarding spontaneous combustion in hay, and other matters connected more directly with the farm, in the booklet, "Fire Prevention on the Farm and Elsewhere," published by the Fire Marshal's Department.

ELECTRICITY

Electric Light

Electric light is infinitely safer than coal oil lamps or any other form of artificial lighting when the equipment is installed in strict conformity with the Rules and Regulations of the Hydro-Electric Power Commission.

Switches

All switches should be in iron-clad boxes, externally operated, and kept tightly closed at all times. This effectually encloses any sparking of the switch and lessens the danger from mechanical injury or short circuit.

Ground Wire

Where conduit wiring is installed great care should be taken to see that the ground wire is kept in good order. The object is to render the conduit safe, or, in other words, prevent anyone from receiving a dangerous or fatal shock which might be caused under certain conditions if the pipe were grasped by the bare hand while standing on wet ground. The ground wire also possesses the function of automatically cutting off the circuit in case of a ground, or what might be termed a leakage, should it occur on the system.

Proper Fusing of Cutouts

The fuse on an electric light or power circuit performs the function, and is the safety valve of the wiring. Filling fuse holders with anything but proper fuses is strictly prohibited. In addition to incurring a danger offenders in this respect are liable to be prosecuted.

If fuses continue to blow out and you are in doubt, send for a qualified electrical wireman; or call in the Hydro-Electric Inspector, as the System now covers the entire Province.

Don't Overload a Circuit

Don't attach heaters, washing machines, small portable motors, etc., indiscriminately to lamp sockets. A law has been passed making it a punishable offence to offer for sale devices of this kind which are not approved by the Hydro Commission, and even if they are approved, to advertise that they may indiscriminately be used on any key socket.

Electric Irons

Electric pressing irons cause many fires by resting on combustible material with the current thoughtlessly left turned on.

Place irons on well-ventilated metal stands and instal in the circuit a red pilot light which will show red whenever the current is on the iron.

Don't Start Without a Permit

The inspection of all inside wiring in the Province of Ontario is administered by the Hydro-Electric Power Commission, regardless of whether the power is supplied by the Hydro, a private electric light company, or generated on the premises. It is illegal for electrical work to be commenced in any building without a permit. When installing electric wiring it is well to see that the wireman or contractor has complied with the law in this respect.

Paper shades on electric globes invite fire.

LIGHTNING

The great annual loss caused by lightning can and should be prevented.

During the year 1918 there were 1,223 fires caused by lightning in Ontario, with a total loss of $547,263; of these 985 were in rural districts, entailing a loss of $491,910.

Of this enormous sum the farmers whose property was destroyed by lightning suffered a direct loss of $169,733.

The records of the Fire Marshal's Office show that only two of the buildings were rodded, and the loss or damage to these amounted to only $28.00. *Rods properly installed are more than* 99 *per cent. efficient.*

Rodded Buildings Immune

In the year 1917, out of a total of over 1,600 lightning fires, causing a loss of $660,164, in no case was the building which was struck equipped with properly installed lightning rods.

From the reports of losses by fire through known causes, sustained by Mutual Insurance Companies in Ontario for the year 1917, no less than fifty-one per cent., or more than half of the total amount, was lost through fires caused by lightning.

Kind of Rods

Copper rods are the most durable and therefore the best, although any metal will do the work as long as it is in proper condition; but iron rusts off at the ground and aluminum also corrodes under certain conditions. A rod composed of two metals, one wrapped around the other, is especially objectionable.

How to Rod

All rods should be grounded eight feet deep. From the ground the cable should run up the corner of the building, over the eave, up the edge of the roof, to the peak, along the peak, down to the opposite eave and into the ground at the opposite corner diagonally opposite the first. Points should be placed every twenty or twenty-five feet along the peak, also on chimneys, dormers, etc. All parts of the system should be connected together, also metallic parts of the structure should be connected to the rods.

Metal Roofs

A metal-roofed building with the metal properly grounded and points on the peak is also well protected against lightning. A metal-roofed building insures further protection from fire that might be caused by flying sparks.

Fuller directions for rodding, also the treatment of the entire subject of lightning rods will be found in Bulletin No. 220 of the Department of Agriculture and will be sent free on application.

FIREPROOFING CLOTHING AND DECORATIONS

It is a simple thing to make decorations fireproof, and especially is this necessary, and should be compulsory, in the case of public festivities, as for instance, where a number of children are gathered together for the annual Christmas tree fête.

The following is a simple and yet absolutely efficient means of making decorations, cotton, wool, etc., non-inflammable:—

Fireproofing Solution

Commercial ammonium phosphate	1 pound.
Water	1 gallon.

Fabrics immersed in this solution, slightly wrung and dried, will not ignite when touched with flame; and, furthermore, when placed directly in flames, the material will only char, and upon removal there will be no smouldering fire.

To obtain these results care must be exercised to see that the fabric is completely saturated with the fireproofing solution and that sufficient of the absorbed solution remains in the fabric, so that after wringing, and upon evaporation of the water, ample ammonium phosphate remains on the fibre to fireproof it. Ammonium phosphate, in addition to its great fireproofing qualities, has the power to render the dye fast.

The solution may be mixed in larger or smaller quantities so long as the same proportion of ingredients is used—*making it a ten per cent. solution.*

The solution is harmless and is not injurious to the skin.

The solution may be used for a variety of fireproofing purposes where cotton, wool or silk materials are worn or used near fire, especially where persons are working near furnaces or open flames.

Curtains, draperies, children's clothes and decorations of all kinds in houses, as well as in stores and hotels, should be fireproofed.

When a fabric is immersed in this solution do not wring it out any more than you would wool underwear when washing in the usual way.

Making Wood Fire Retardant

A number of different chemicals have been used to make wood fire retardant or non-inflammable, but its *combustibility* is not thereby destroyed. The wood will smoulder slowly.

Probably the most efficient protection to wood—for interior use—is silicate of soda. If boards or planks of moderate thickness are brushed three or four times over on each side with a strong solution, they are rendered partially incombustible. They will, however, burn under intense heat. The silicate fuses and forms a glass which envelopes the surface, and even the internal fibres of the wood, if it is sufficiently saturated, are thus sealed up from the oxygen of the air.

A treatment known as "Burnettizing" consists of immersing the timber in a solution of zinc chloride. This tends to harden the wood and renders it partially incombustible.

Asbestos paint is also used as a fire retardant.

FIRE PREVENTION DAY

October 9th has been adopted by general consent as "Fire Prevention Day" throughout North America.

A special opportunity is thus afforded everyone to co-operate in the great Clean-Up Campaign and help awaken in the public mind a universal watchfulness against careless habits that are causing the impoverishment of our country through the enormous waste caused by preventable fires.

It was on October 9th, 1871, that Mrs. O'Leary's cow kicked over a lamp and started Chicago's great conflagration, which consumed 18,000 houses, extending over an area of more than 2,000 acres. Two hundred persons perished and nearly 100,000 were rendered homeless. The property burned was estimated at two hundred million dollars.

Like other fires it was small when it started; and like the majority of fires it was the result of carelessness.

Make sure that the sparks are out.

PERSONAL LIABILITY

A hard method of making fire.

The following is quoted from an Act amending the Criminal Code respecting Prevention of Fire which became law June 6th, 1919:—

His Majesty, by and with the advice and consent of the Senate, and House of Commons of Canada, enacts as follows:—

1. Section 515 of *The Criminal Code* is amended by inserting the following subsection immediately before sub-section two thereof:

(1A) Everyone is guilty of an indictable offence and liable to two years' imprisonment who by negligence causes any fire which occasions loss of life or loss of property.

The person owning, occupying or controlling the premises in which such a fire occurs, or on which such fire originates, shall be deemed to have caused the fire through negligence if such person has failed to obey the requirements of any law intended to prevent fires or which requires apparatus for the extinguishment of fires or to facilitate the escape of persons in the event of fire, if the jury finds that such fire or the loss of life, or the whole or any substantial portion of the loss of property, would not have occurred if such law had been complied with.

(2) The Act is further amended by Section 515A which makes provision regarding the refusal to make alterations, remove materials or supply apparatus when ordered by proper authorities.

PREVENTION OF FOREST FIRES

The physical condition of the virgin forest with years of accumulated *débris* creates a serious fire hazard, added to which is the slash caused by timber, tie and pulp operators. Within the last few years enormous areas have been opened up by new railway lines in Northern Ontario. These railways have passed through forest regions, opening them to settlers, prospectors, and timber men, all carrying in their wake serious problems of forest fire prevention. Hundreds of lives have been lost and thousands of acres of good timber lands have been burned in this country because people were careless.

The protection of forest areas has made considerable advance in Canada during the past decade. Ontario now employs over 1,000 rangers or patrol men during the maximum dry period. It is, however, vitally necessary for the settler, tourist, woodsman and others to realize the great importance of preventing the destruction of the forest by fire.

Legislation requires that a person setting out fires during the dangerous season shall have a written permit before a fire can be started. Permits are issued by the Forest Ranger, and a staff of Rangers is kept in new settlements to enforce the regulations.

The common method of detection developed during the past ten years has been through the erection of lookout towers, so placed that large areas are under observation from these points. Where possible these lookout towers are connected up with sources of assistance by telephone. The great problem is to reach and extinguish the fires before they get beyond control.

On some of the larger lakes power boats with pumps and hose are installed, which will control fires within two thousand feet of the shores. Portable gasoline pumping units are also being used where water is available. In much of the territory, however, the only method of fighting fires that can be resorted to is the use of the shovel, grub hoe and axe.

The Forest Ranger in semi-settled districts carries a great responsibility, and should have the hearty co-operation of every person to prevent fires.

Camp Fires

When selecting a place to build a camp fire see that it is not covered with leaves, dry grass, moss, *nor close to trees or underbrush.* Moss and dry turf may smoulder for some time before they break out in flame, and may in this way carry the fire a considerable distance from where it originally started. Make it a strict rule to see that the fire is quenched and thoroughly wet down with water before you leave. A good plan is to dig a trench around the camp fire and use the earth to smother the embers. Never build a fire against a tree, because it may kill it.

CHEMICAL FIRE EXTINGUISHERS

You cannot always put the responsibility up to a well-equipped fire department to protect your life and property. You should have your own fire-fighting equipment—and it must be always ready and efficient. All fires are small when they start. Attack the seat of the fire at once. It is the first two or three minutes that count for most.

Chemical fire extinguishers, of approved design, should be kept in convenient places, and one should always be kept in an automobile.

Care should be exercised in buying fire extinguishers, to *see that the containers are* made of copper; as steel and iron will corrode and render the extinguisher useless inside of a year or two.

The standard types of fire extinguishers bear the labels of the Underwriters' Laboratories, which insure their efficiency, construction and material.

There are several liquid chemical fire extinguishers on the market that contain carbon tetrachloride as the extinguishing fluid. These are reliable and easily handled.

The tubes of dry powder sold as fire extinguishers are practically useless. Don't buy them. They won't give you protection.

Casks and Pails

In addition to having Chemical Fire Extinguishers in the dwelling, warehouse, and factory, it is well to have fire buckets filled with water located in convenient places. For effective work add one-half to three-quarters pound of bi-carbonate of soda to each gallon of water in fire pails and casks; as *bi-carbonate of soda is a fire-killer.*

In planning for the proper protection of a building it is well to use the fire pail as a unit. Allow two pails to every 1,000 square feet of floor space as a minimum; and figure that a two-and-a-half gallon chemical fire extinguisher is equal to six pails of water.

TO PREVENT FREEZING

Use Calcium Chloride

Where water barrels, pails or hand pump extinguishers are located in buildings subject to freezing temperatures, calcium chloride should be used to lower the freezing point of the contents.

Calcium chloride is recommended in preference to common salt, because the latter rusts metals, such as hoops, &c., and because the salt has a tendency to "Creep" and "Crystallize."

Where it is impossible to secure calcium chloride, one pound of salt to eighteen gallons of water might be used, adding four ounces of salt to the solution for every degree Fahrenheit below thirty. One gallon of water weighs 8.35 lbs.

The salt must be entirely dissolved and should be mixed in a vat before being placed in barrels. Use barrels with wooden hoops.

Salt and water solutions will freeze at temperatures below 8 degrees F. and should not be used where lower temperatures are encountered.

Table showing temperatures at which water will freeze when calcium chloride is added in the proportions stated:—

Temperature of freezing in degrees F.	Pounds of Calcium Chloride per gallon of water.	Temperature of freezing in degrees F.	Pounds of Calcium Chloride per gallon of water.
29	½	3-4	2½
27	1	-1-4	3
25	1¼	-8-11	3½
23	1½	-17-19	4
21	1¾	-27-29	4½
18	2	-39-41	5
14	2¼	-50-54	5½

FROZEN WATER PIPES

To thaw water pipes that have become frozen, wrap the frozen section with cloth and pour boiling hot water upon it until the ice in the pipe gives way. Rags on the floor at the base of or under the pipe will absorb the waste water. If the freezing is too severe to yield to this treatment send for a plumber.

A burning match, torch or open flame of any description should never be employed for the purpose of thawing water pipes. Wrapping the pipes with oil-soaked rags and setting them on fire is worse than folly—it is incendiarism.

FIRE HYDRANTS

Fire hydrants, whether public or private, should be of standard type, with a barrel of not less than six inches in diameter, and be fed from a water main of not less than the same diameter, forming a complete circuit of the system, without dead ends, or any obstruction to the free flow of water.

Hose

There is a loss of head due to friction in the passage of water through two-and-a-half inch hose of the best rubber-lined quality of about fourteen pounds per hundred feet of hose. With the ordinary quality of hose, commonly used, such loss of head may reach twenty-five or more pounds per hundred feet.

A standard fire stream demands the delivery of not less than two hundred and fifty gallons of water per minute through a one and one-eighth inch smooth bore nozzle, and to secure this volume it requires a pressure of not less than forty-five pounds to the square inch at the base of the nozzle; this will give approximately a reach of sixty-three feet horizontally and about seventy feet vertically.

FIRE PREVENTION IN THE FACTORY

Every factory, store, warehouse, or other institution, great or small, is a part of the Nation's assets. If one be destroyed, particularly at this time when Canada needs every ounce of her vitality, her ability to successfully compete with other Nations of the World will be lessened to a proportionate degree.

The destruction of a factory by fire maims the City or Town in which it is located, just the same as you or anyone else might be maimed by the loss of an arm, leg, eye, or other member. The progress and prosperity of the Province and Nation is affected in proportion to the suffering of the City or Town.

Ascertain the fire hazard of everything and safeguard these things accordingly. Crowding of merchandise should be avoided so as to facilitate inspection and insure order and cleanliness.

Openings that are exposed to sparks from foundry cupolas, locomotives, &c., should be screened.

Carry rubbish out of the building.

Keep sidewalk vault lights and window panes whole. Keep plastering and sheathing in repair so that nothing can be thrown into the opening and spaces.

Forbid smoking in the premises, except in a fireproof room provided for the purpose.

Fire doors should be kept closed when not actually in use, especially at night, and also kept free from all obstruction.

Shipping and Receiving Rooms

Prevent the accumulation of excess packing material and empty boxes.

If excelsior, papers, hay or other combustible materials are used for packing, keep only one day's supply on hand at a time in a tin-lined bin or box and provided with a counter-weighted lid or door having a fusible link to insure automatic closing in case of fire.

Machinery and Workshop

Use standard waste cans with self-closing lids as receptacles for oily waste, rags or oil-soaked material that may cause fire from spontaneous combustion. As this material becomes useless burn it every day in the furnace before closing.

Keep oily rags in metal cans.

Danger from Linseed Oil

Paint, varnish and oil-fillers usually contain linseed oil which will oxidize, heat, and set fire to rags, excelsior or other similar combustibles used for rubbing down or wiping up these materials. Do not let these lie neglected for even an hour. All combustible waste material used in manufacturing should be removed from the building daily to a safe place unless it can be burned at once.

Lime

Lime in slaking generates a heat of 800 degrees F. Keep unslaked lime in a dry place, away from leaks in a shed or wherever stored.

Metal Lockers for Clothes

Metal lockers should be provided for employees' clothing to minimize the danger from fire of a hot pipe left in the coat or oily waste in the overalls pocket.

Lubricating Oil

Catch oil drip in metal pans. Don't use sawdust or other combustible material to absorb it.

Manufacturers Dread Fires

No one dreads a fire more than a manufacturer. When his plant is burnt his trained workmen are thrown out of a job, the business which has taken years to build up is dissipated; and the town immediately suffers on account of the circulation of the weekly pay roll being stopped.

While two out of three fires occur in the homes of our people the big losses are caused by fires in Industrial Plants.

During 1918 there were 486 fires in Industrial Plants, or only 5 per cent. of the total number for the year; but these 486 fires caused a loss of $7,565,322 or 48 per cent. of the total fire waste of the Province.

It is important to have clean basements.

Automatic Sprinklers

When properly installed in factories, warehouses, stores, &c., with sufficient water supply at proper pressure, and the equipment maintained in a constantly operative condition the automatic sprinkler has proven itself to be the most reliable and satisfactory fire extinguishing device in use.

In 15,000 fires tabulated by the N. F. P. A., Boston, where sprinkler systems had been installed, eighty-five per cent. were extinguished by one sprinkler head.

Watchmen

Efficient watchman service is very important and should be maintained at all times when a plant is not in operation, and the record of service be shown on a clock dial or such mechanical device as will not permit evasion of duty.

In small factories or stores where only a few persons are employed the proprietor or superintendent should make a thorough inspection of the premises five or ten minutes after everyone has left the place for the night, in case a match or cigarette butt has been carelessly thrown on the floor and left to smoulder amongst combustible material.

Shafting Should Be Grounded

All shafting and machines with belts that are liable to cause static electric sparks should be well grounded.

CELLULOID DANGERS

Through a combination of cotton and camphor with certain acids, a material of very common use is made, and is sold to the public under various trade names, such as: "French Ivory," "Celluloid," "Viscoloid," "Fibreloid," "Pyralin," "Xylonite," "Parisian Ivory," "Ivertone," "Ivortus," etc. This is a valuable and convenient material; nevertheless, it is charged with causing a large number of fires.

When this material is made up in the various articles of commerce it is hard, smooth and shiny; and in many colors, but generally of a white or creamy tint. Some of these articles will be found in almost every room of your house, from the kitchen and living-room to the bedroom. They consist of brush and mirror backs, combs, hairpins, collars, toys, eyeshades, cuffguards, knife and fork handles, boxes, trays, clocks, picture frames, shoe eyelets, keys on the piano, etc.

This is a substance that should be understood and properly taken care of to prevent ignition. We quote from a report of the Bureau of Standards of the United States Government as follows:

"If heated somewhat above the boiling point of water, decomposition takes place so rapidly that the material heats itself to a point where ignition or explosion occurs. A hot curling iron, or even a steam radiator, may be sufficient to cause ignition of these materials. Many persons have been seriously burned by the use of combs, collars, and other celluloid articles."

A particular warning is necessary against the use of knives and forks with celluloid handles. Do not put hot curling irons into a dresser with celluloid combs or hairpins; while ash-trays and burnt-match receivers should be abolished altogether. It is very dangerous to use a candlestick made of celluloid. If you have one in the house, break it up immediately and throw it away. The great danger that these celluloid articles present comes from the fact that they are so common and take fire so easily.

However, the precaution necessary to keep them harmless is very simple: *Keep them away from fires and from great heat.*

IN CASE OF FIRE

Upon the first discovery of fire, after giving the alarm to the inmates of the building, it should be a rule in every instance to summon the Municipal Fire Department and then make the most prompt and effective use of the equipment at hand.

Know where the nearest fire alarm box is located. If the fire is any distance from the box wait at the box until the firemen arrive so as to direct them to the proper location. If you telephone the alarm *be sure to give the address distinctly.* Always save life before property. In saving property take out the most valuable things first.

Always keep your head, and don't get excited. Make your plans in advance, as to what should be done in case of fire.

Avoid Panic

You should never shout "Fire" in a crowded room, as it would doubtless cause a panic and might result in serious loss of life.

Walk—Don't Run

If you discover fire where a number of people are gathered, speak of it calmly, and tell them firmly that there is no danger if they will go out quietly and by the nearest exit.

Quick Action is What Counts

A fire may easily be quenched at its incipiency by the vigorous use of a broom kept thoroughly wet; or by being smothered by the application of wet blankets, rugs, sacks, &c.

A lamp or oil-stove fire may be smothered by throwing a quantity of flour or sand on the blaze. *Don't throw water on coal oil or gasoline.*

Bucket Brigade

In places where there is no organized fire department, volunteers can do good work at a fire by forming a bucket brigade.

Form an endless chain of volunteers with pails of water, between the water supply and the fire. One person should take command and direct how and where to throw the water so as to get most effective results.

Wet blankets may be used to throw over roofs or hung up in front of buildings to prevent them catching fire.

Chimney Fire

A chimney fire may be extinguished by pouring buckets of sand or earth down the chimney or by igniting a handful or two of common powdered sulphur in the chimney. Close all openings, and if there is an open grate hang a wet blanket in front of the fire-place so as the sulphur fumes will go up the chimney. The sulphur forms sulphurous acid with the oxygen of the air and thus renders the latter incapable of supporting combustion.

Fires must be put out while they are small.

In Escaping from Fire

In making escape from a fire, if the smoke is dense, put a wet cloth or handkerchief around your mouth and nose; creep along the room with your face close to the ground.

Press out a spark instantly if one catches in your clothing, and remember that running into the air will cause it to blaze immediately.

To quench the fire in a person's clothing, take a blanket or any woollen cloth (not cotton) and wrap it tightly around the body and roll her on the ground. Be careful to keep the flames away from the face. Don't tear the clothes off a person who has been burned. Cut them off as quickly as possible with a sharp knife or pair of scissors.

Smothering burning clothing with a rug.

First Aid

The first application to a burn should be sweet oil or olive oil, and then dust or scatter flour or baking soda (soda bi-carb.) over the burned parts to exclude the air; and cover with clean linen or antiseptic gauze.

If oil is not to be had put a covering of soda or flour on the wound immediately. Don't pour water on the burned parts. Protect them from the air as quickly as possible, as above directed, or use one of the many remedies which may be at hand for soothing the burn and preventing a scar being left on the person.

A simple and yet excellent remedy for burns can be made by mixing equal parts of linseed oil, or olive oil, with lime water; shake thoroughly and apply freely to the affected parts; cover with antiseptic gauze.

Close All Doors

Close the door behind you, when leaving a burning room, to prevent the fire spreading.

Rescuing an Insensible Person

To rescue a person who has been overcome from smoke in a burning building, use the Fireman's Lift. If the smoke is very thick, and there is not time or opportunity to act otherwise, turn the person on her back and pull her out feet foremost.

This method will tend to reduce the possibility of suffocation.

To Improvise Ropes

If caught in a fire and cut off from escape, do not jump from an upstairs window unless there is a "Life Net," mattresses or something soft to fall on. Tear blankets or sheets along the warp in strips about twelve inches wide and tie the ends together with a reef knot and slide to the ground. To lower a person from a window to the ground use the Fireman's chair knot.

Rescuing Animals from Fire

Animals as a rule, particularly horses, get so overcome with terror that they will do nothing to save themselves from fire. The best way if a horse is struggling to get loose is to watch your chance and rush past him and grasp his head. Untie or cut his halter strap, throw a bag or horse blanket over his head, so as to blindfold him, and back him out of the stall.

ENTERING A BURNING BUILDING

Care must be taken when entering a burning building or room. If the fire has been burning for some time look out for weak spots or holes in the floor.

If the smoke is dense cover the mouth and nose with a wet sponge, stocking or towel tied securely, so as to leave the hands free. Crawl on your hands and knees close to the floor where the air is breathable.

Fire Department Has Right of Way

Pedestrians should keep on the sidewalk when apparatus is responding to a fire.

Always give the right of way to the Fire Department. If driving on the street it is best to stop near the curb until the apparatus passes.

If you wish special information or instructions ask one of the local firemen and he will be only too pleased to give it.

HOW TO SEND IN A FIRE ALARM

Locate the nearest Fire Alarm Box to your home. If it opens with a key it will be found either in the door or hanging on a chain along the side; or, if not there, find out who keeps the key.

The ordinary box has no key; you simply turn the handle to the right; and still others are protected with glass which you should immediately break.

You will notice a hook projecting through a slot in the inside door; *pull this hook down to its full extent—once only—and let it go,* then listen for the working of the machinery. If you can hear it, your alarm is going in correctly. If the door of the box happens to be open when you first arrive, close it, then open it again and send in the alarm as directed above. In case you don't hear the working of the machinery in the box close the door immediately; after waiting a moment open the door and pull the hook again, repeat as often as necessary until you hear the working of the machinery.

Wait until the firemen arrive and direct them to the fire.

If you don't know where the nearest alarm box is located, use the 'phone and ask central for Fire Headquarters and tell Fire Department Operator *in a clear voice the exact address* of the building where the fire is.

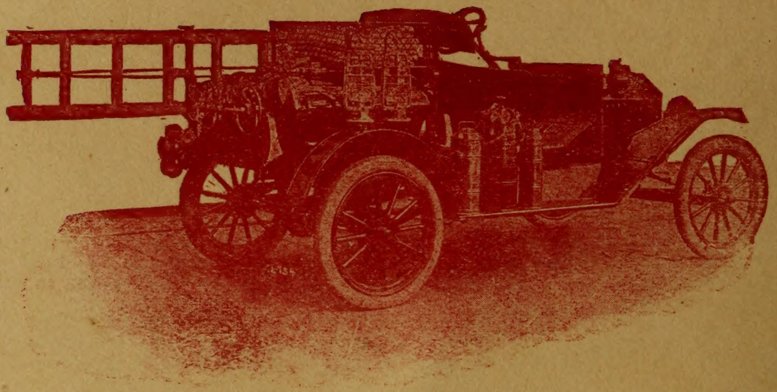
WARNING

When in a place of public assembly such as a theatre, dance hall, lecture hall, etc., LOOK AROUND AND NOTE THE NEAREST EXIT TO YOU. In case of fire or panic WALK, not run, to that exit and do not try to beat your neighbour to the street.

Principal Duties of Volunteers at Fires

A fire that has gained sufficient headway will carry sparks and burning embers, especially if there is a strong wind, a long distance and endanger surrounding property. Volunteers can do good work and aid the Fire Department very materially by patrolling the district in the direction to which the wind is blowing and immediately quench sparks and put out incipient fires on shingle roofs, or in other inflammable material.

Acknowledgment: To the courtesy of the National Board of Fire Underwriters we are indebted for the use of some of the illustrations from "Safeguarding the Home Against Fire."



STANDARD CHEMICAL FIRE ENGINE OF THE CARBONIC ACID GAS TYPE

The equipment consists of two hundred feet of ¾-inch chemical hose.

Two 25-gallon chemical tanks.

Two 3-gallon fire extinguishers.

An 18-foot extension ladder, together with axes, lanterns and crow bars.

The pressure generated in the tanks by the bi-carbonate of soda, sulphuric acid and water is about one hundred and twenty pounds to the square inch, which furnishes ample pressure for a good nozzle stream.

COMMUNITY PROTECTION

It would be a good idea in these days of motor-driven fire apparatus for a village or for a number of farmers residing in a district to club together and buy a combination truck. The cost would not be great, the up-keep trifling, and the protection afforded can be readily seen and would warrant the investment.

The apparatus could be centrally located, and on call by telephone could be rushed to the scene of a fire at a moment's notice.

The equipment on the truck should consist of two or more chemical tanks each of about 25 gallons capacity, so that when one tank was emptied another would be ready for action and the emptied tank could be immediately refilled. A pump with a suction pipe could be used for pumping water from a well, pond or creek in case the chemicals were not enough to extinguish the blaze.

MOTOR vs. HORSES

Fire Chief Grange, of Peterborough, in a report to the Council, gives details of a fire on March 31st, *when they covered a distance of 2½ miles in three minutes.*

> "The fire, in a residence, was caused by spontaneous combustion and was making rapid progress. On arrival we used the forty-gallon chemical tank with which the car was equipped and had the fire extinguished and I was making the customary inspection of the premises when the horse-drawn apparatus arrived—*seven minutes later.* The loss was confined to $20 on the building and $80 on the contents, both of which, in my opinion, would have been total losses had we been dependent on the horses alone."

WHAT A MOTOR PUMP CAN DO IN THE COUNTRY

Fire Chief Phillips, of the Soo, in reporting a fire which occurred on January 8th, makes the following comment:

> "The Reeve of Kerah Township called me by 'phone asking if I could come out and try and save a farmer's house about a mile from the city limits. I took our new Motor Pumper and went out and found a little stream of water near the house where we put the pumper to work and saved three parts of the house and all his barns and sheds. The snow was about eighteen inches deep, but the truck made it fine, which demonstrates what these ——— ——— Motor Pumpers can do."